

REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested. Please amend claims 1, 17, and 26-27, and add new dependent claim 28. With this amendment, claims 1, 3-20, 23-24, and 26-28 remain in the case. No additional claim fees are required, as the number of pending dependent claims remains less than the number of dependent claims paid for in the original filed application.

On page 2 of the instant office action, the Examiner rejected claims 1, 3-20, 23-24, and 26-27 under 35 U.S.C. § 103(a) as being unpatentable over Mraz US 20010015573 ("Mraz"), since issued as U.S. Pat. No. 6,799,809, in view of Densmore U.S. Pat. No. 2,973,949 ("Densmore"). The Examiner stated that Mraz discloses the present invention substantially as claimed, other than "the first or second actuator displaceable steering element extending and the other of the first or second actuator displaceable steering element retracting," which he indicated was disclosed by Densmore. Examiner did not explicitly discuss individual claims in the present application. Applicants' undersigned attorney respectfully submits that, with the amendments proposed herein, claims 1, 3-20, 23-24, and 26-28 are allowable over Mraz and Densmore. Specific claims are addressed below.

Claim Rejections – Independent Claim 1

Applicant proposes amending claim 1 to include the limitations of "a first actuator carried on and connected to only one of said miner, said conveyor unit and said steering unit" and "a second actuator carried on and connected to only one of said miner, said conveyor unit and said steering unit." In the present invention, the first and second actuators may be carried on the miner or conveyor unit and engage, but are not connected to or carried by, the steering unit. *See* Specification, page 25, line: 17 – page 27, line: 6, and Figs. 5c-d. Alternatively, the first and second actuators may be carried on the steering unit and engage, but are not connected to or carried by, the miner or conveyor unit. *See* Specification, page 21, lines: 18-24, page 25, lines: 3 – 16, and Figs. 4, 5a-b, and 6. Applicant respectfully submits that the cited prior art do not disclose the claim 1, as amended.

Mraz discloses a mining machine (1) connected to a receiving module (4) with extenders (12), shown in the drawings as advancing cylinders. Mraz, Paragraph 51. In an alternate embodiment, the advancing cylinders (12) connected to the mining machine (1) are mounted on an advancing machine (4a) separate from the receiving module (4). Mraz, Paragraph 52. The mining machine (1) in Mraz is connected to its following unit, be it the receiving module (4) or the advancing machine (4a), by the advancing cylinders (12). The receiving module (4) or advancing module (4a) includes side jacks (8). Mraz, Paragraph 51. The side jacks (8) brace the advancing machine (4) or receiving module (4a) against the sides of the mine, then the advancing cylinders (12) extend to advance the mining machine (1). Mraz, Paragraphs 64 and 68. The side jacks (8) are then released and the cylinders (8) retracted to move the advancing module (4a) or receiving module (4) up behind the mining machine (1). See Mraz, Paragraphs 64 and 70. This process is repeated to advance the miner in an "inchworm" manner, expanding and contracting the total length of the mining machine (1) and following advancing module (4a) or receiving module (4).

In Mraz's "inchworm" method of advancement, it is necessary that the advancing cylinders (12) be connected to both the mining machine (1) and following unit (4 or 4a) so that retracting the advancing cylinders (12) can produce a pulling motion, drawing the following unit up behind the mining machine (1). Mraz's advancing cylinders (12) connected at both ends do not disclose the first and second actuators of the present invention which are carried on and connected to only one unit in the mining apparatus and do not connect it to another unit, but instead only engage a bearing surface on another unit.

Densmore also does not disclose the first and second actuators of the present invention, each "carried on and connected to only one of said miner, said conveyor unit and said steering unit." Densmore discloses a mining and loading machine having a frame (2) carrying a horizontal turntable or swivel mounting (3) on which a horizontally swingable frame (4) is mounted. Densmore, Column: 2, Lines: 20-24. Hydraulic jacks (17) operatively connected at (18) to the swingable frame (4) serve to swing the swingable frame (4) on its turntable mounting. Densmore, Column: 2, Lines: 49-54. Densmore explicitly states that each of its jacks (17) are

connected to the swingable frame (4), and Fig. 1 indicates that the jacks (17) are also attached to the main frame (2). See Densmore, Column: 2, Lines: 49-54, and Fig. 1. A "pushing" extension of one of the jacks (17) is accompanied by a "pulling" retraction of the other of the jacks (17), forcing the swingable frame (4) to rotate. The machine of Densmore would not be functional without being connected to both the frame (2) and the swingable frame (4), as no support would exist for the pulling motion. Similar to Mraz, Densmore does not disclose actuators which are carried on and connected to only one unit of a mining apparatus.

Applicants respectfully submit that the cited prior art does not teach or suggest the limitations of claim 1, as amended. As such, it is respectfully requested that the Examiner withdraw the instant § 103 rejection and allow amended claim 1 and dependent claims 3-16 based thereon.

Claim Rejections – Dependent Claim 3

Notwithstanding Applicants' assertion that claim 1 and all claims dependent thereon are not obvious in light of the cited prior art, Applicants wish to specifically address dependent claim 3.

Claim 3 recites the mining apparatus of claim 1," wherein said first displaceable guide element includes a first end having a first convex crown and said second displaceable guide element includes a second end having a second convex crown." Claims 7-10, each dependent upon claim 3, indicate that the ends are used to engage cooperative bearing surfaces. The Examiner does not specifically address claim 3 and dependent claims, or how Mraz and Densmore disclose these limitation. The prior art does not disclose cylinders or jacks having ends with convex crowns. Applicants respectfully submit that the cited prior art does not disclose the limitations of claim 3 and requests that the rejection of claim 3 and all claims depending therefrom be withdrawn.

Claim Rejections – Independent Claim 17

Applicants respectfully submit that the cited prior art does not disclose claim 17's limitation of "a conveyor unit pivotally connected to said miner at a midline of said miner." In Mraz, the receiving module (4) is part of the self-propelled conveying assembly (5) and, in one

embodiment, directly follows and is connected to the mining machine (1). Mraz, Paragraph 51, Figure 4. In this embodiment, the receiving module (4) is connected to the mining machine (1) via two advancing cylinders (12), each of the advancing cylinders (12) located on opposite sides of the midline of the mining machine (1) and receiving module (4). *See* Mraz, Paragraph 51, Figure 4. Mraz does not disclose a connection between the receiving module (4) or conveying assembly (5) and the mining machine (1) at the midline of the mining machine (1).

Applicants previously discussed that steering in Mraz is a result of unequal extension of the advancing cylinders (12) on either side of the midline of the mining machine (1). Should the conveyor unit in Mraz be pivotally connected to the miner at the midline of the miner, the distance between the two would be fixed and the miner could not be advanced using the disclosed "inchworm" method. The Federal Circuit has affirmed a summary judgment of nonobviousness in a case where no reason had been advanced to modify a prior art compound in a way that would destroy an advantageous property. *See Eisai Co. Ltd. v. Dr. Reddy's Labs., Ltd.*, 533 F.3d 1353, 1358 (Fed. Cir. 2008). Although this case does not involve similar technology as the present invention, the same principal applies. It is implausible that a modification of Mraz which would render the mining apparatus unable to move could be obvious.

Densmore also does not disclose "a conveyor unit pivotally connected to said miner at a midline of said miner." The mining and loading machine of Densmore does not include a conveyor unit distinct from, but pivotally connected to, a miner, but instead simply uses a rear discharge conveyor (9) integrated within the machine to move material rearwardly of the machine. *See* Densmore, Column: 4, Lines: 27-31.

Applicant respectfully submits that the cited prior art does not disclose claim 17. As such, it is respectfully requested that the Examiner withdraw the instant § 103 rejection and allow amended claim 17 and dependent claims 18-20 based thereon.

Claim Rejections – Independent Claims 23, 24, and 27

Independent claims 23, 24, and 27 each recite methods of guiding a mining apparatus, including steps to adjust a connection angle and bring a miner to a desired directional heading.

The final steps for claims 23 and 24 are respectively "advancing said mining apparatus after adjusting said connection angle" and "advancing said miner along said desired directional heading." Claim 27 is amended herein to include a final step of "advancing said mining apparatus after controlling said connection angle." In each of the three claimed methods, the miner or mining apparatus is advanced only after the steering steps have been completed.

On page 2 of the instant Office Action, the Examiner states that Mraz discloses the present invention substantially as claimed, other than "the first or second actuator displaceable steering element extending and the other of the first or second actuator displaceable steering element retracting." Applicant respectfully disagrees and notes that the apparatus and method disclosed in Mraz is incapable of not advancing until after the steering step has been completed.

As discussed in connection with claim 1, the apparatus disclosed in Mraz advances using an "inchworm" method based on repeatedly extending and retracting its advancing cylinders (12). The advancing cylinders (12) can steer the mining machine (1) while advancing by extending in different amounts or at different rates on either side of the mining machine (1). Mraz, Paragraph 51. Using the method disclosed by Mraz, steering the mining machine is a byproduct of advancing the mining machine. The mining machine cannot be redirected unless it is simultaneously being advanced. The preambles of both independent claims in Mraz explicitly state this limitation, claiming "[a] method of simultaneously steering and advancing a mining machine..." and "[a]n apparatus for simultaneously advancing and steering a mining machine..." The cited prior art therefore cannot disclose claims 23, 24, and 27 of the present invention, which recite the miner or mining apparatus being advanced only after the steering steps have been completed.

Claim Rejections – Independent Claim 26

Claim 26 has been amended herein to include the additional limitation of "where said conveyor unit remains adjacent to said miner at said midline of said miner during adjustment of said connection angle." Applicant respectfully submits that the cited prior art does not disclose claim 26, as amended.

Fig. 6 provides a top plan view illustrating how the connection angle between miner and conveyor unit may be altered from parallel in order to provide a directional heading change for the miner. As shown in the drawing, adjusting the connection angle causes miner to pivot about the pivotal connection located at the midline of the miner. Adjusting the connection angle causes one of the first side and second side of the miner to move slightly closer to the conveyor unit and the other of the first side and second side to move slightly further from the conveyor. However, at the midline of the miner, the distance between the miner and conveyor unit remains substantially unchanged.

In contrast, Mraz discloses a method of simultaneously steering and advancing a mining machine (1) by repeatedly increasing and decreasing the distance between the mining machine (1) and a following receiving module (4) or advancing machine (4a). The invention disclosed in Mraz is not capable of having a conveyor unit remain adjacent to its mining machine (1) at a midline or at any other location during adjustment of a connection angle, as adjustment of a connection angle is dependent upon increasing the distance between the mining machine (1) and its following unit.

Claim 26 also includes the limitations of "first and said second actuators each including a displaceable steering element having an end engaging a bearing surface on one of said miner and said conveyor unit." As discussed in connection with claim 1, both Mraz and Densmore disclose advancing cylinders (12) or hydraulic jacks (17) which are affixed or connected at two positions and thus do not teach having an end engaging, but not connected to, a bearing surface.

Applicants respectfully submit that the cited prior art do not disclose all claim 26, as amended. Therefore, Applicants request that the instant rejection of claim 26 be withdrawn and the claim be allowed.

New Claim 28

Applicants propose adding new claim 28 herein. Claim 28 is dependent upon claim 1 and includes the further limitation of "wherein spacing between said miner, said steering unit, and said conveyor unit along said midline of said miner remain substantially unchanged during adjustment of said connection angle." Support for claim 28 may be found in Fig. 6 and

elsewhere in the specification. In the displayed embodiment, extension of one of the displaceable guide elements and retraction of the other displaceable guide element causes the connection angle between the miner and conveyor unit to be altered by up to 2.5 degrees either side of parallel. See Specification, page 23, lines: 3-9, and Fig. 6. By comparing Figs. 5a-d, where the miner and conveyor unit are substantially parallel, and Fig. 6, where the connection angle between the two has been altered by 2.5 degrees, it can clearly be seen that the spacing between the miner, steering, unit, and conveyor unit along the midline of the miner remains substantially unchanged. As has been previously discussed, Mraz discloses a mining machine (1) connected to a following receiving module (4) or advancing machine (4a) by advancing cylinders (12) which extend and retract, changing the distance between the mining machine (1) and following unit. See Mraz, Paragraph 51. Mraz does not disclose the means for connection and steering disclosed in the present invention, in which the spacing between elements along the midline of the miner remains substantially unchanged.

Secondary Considerations

The legal conclusion as to whether a given product was obvious at the time of invention to one of ordinary skill in the art is a path fraught with pitfalls, including especially the inherent difficulty of making such a hypothetical judgment and the tendency to use (even subconsciously) "hindsight" and the inventor's own work to determine obviousness. See 2 Donald S. Chisum, Chisum on Patents § 5.05 (Matthew Bender). Consequently, courts look to objective guideposts for aid and assistance. *Id.* In *Sarkisian v. Winn-Proof Corp.*, the Ninth Circuit commented:

These secondary considerations are equally important, moreover, where the patent inquiry involves the 'technologically prosaic' arts often relevant to mechanical devices. In these cases the operative principles of the device are more comprehensible to the ordinary layperson, and the state of the prior art more fully understood. Judicial recognition of the importance of secondary considerations in these cases may serve to check the tendency to translate this comprehension into the conclusion that the invention was obvious.

Sarkisian v. Winn-Proof Corp., 697 F.2d 1313, 1321 n.16 (9th Cir. 1983), cert. denied. In this case, secondary considerations serve as guideposts toward a finding that the present invention was not obvious at the time the instant application was filed.

Objective evidence relevant to the issue of obviousness must be evaluated by Office personnel. MPEP § 2141(II). Applicant herein submits evidence of technical advantages provided by Applicant's invention which are not present in the invention of Mraz, submitted by way of a declaration under 37 C.F.R. § 1.132, being the Declaration of John Baird.

As previously discussed, Mraz's "inchworm" method of advancement involve a repeated process of extending advancing cylinders to advance the mining machine then retracting the cylinders to move the following unit up behind the mining machine. This method of advancement requires that the advancing cylinders be connected to both the mining machine and following unit so that retracting the advancing cylinders can produce a pulling motion, drawing the following unit up behind the mining machine. Although not explicitly stated in Mraz, the drawings and the nature of Mraz's method of locomotion require that the advancing cylinders be connected to both the mining machine and following unit by pivotal connections. *See Baird Declaration*. Figs. 20 and 21 of Mraz show the advancing cylinders terminating in circular devices, namely, generally cylindrical pivotal connections, viewed from above. As one advancing cylinder is extended further than the other to steer the mining machine, the connection angle between the mining machine and the following unit changes. *See Baird Declaration*, Paragraph 5. If the advancing cylinders were perpendicularly fixed to the mining machine and following unit, and did not use a pivotal connection, the change in connection angle caused by steering the mining unit would cause the attachment between the advancing cylinders and at least one of their supports to break. *Id.*

Attaching the advancing cylinders via pivotal connections allows the connection angle between the mining machine and following unit to change, enabling the mining machine to be steered by extending the cylinders in different amounts or at different rates on either side of the mining machine. *See Baird Declaration*, Paragraph 6. However, the method of advancement disclosed by Mraz also subjects the pivotal attachments to shear stress. As the advancing

cylinders are extended in different amounts, the mining machine and following unit deviate from a parallel arrangement, and the advancing cylinders do not apply their force perpendicularly to each unit. *Id.* The force of the advancing cylinders applied in a non-perpendicular manner causes shear stress to be applied parallel to the face of the mining unit and/or tangential to the pivotal connections. *Id.* The pivotal connections risk deformation or breakage if subjected to a heavy load, which limits the force which can be used to extend the advancing cylinders and/or requires extremely heavy duty pivotal connections. *Id.*

In contrast, present invention separates the pivotal connection between the miner and conveyor unit from the actuators/advancing cylinders. Referring to the embodiment disclosed in Fig. 5a, the first and second actuator are mounted to the frame of the steering unit laterally spaced from the midline of the miner. The second pivot pin connects the third clevis and the third mounting bracket, creating a pivotal connection between the miner and the conveyor unit located at the midline of the miner. The connection angle between the between the miner and conveyor unit may be altered by extending the displaceable guide element of one actuator while retracting the displaceable guide element of the other actuator the same amount. The actuators are mounted on and connected to only the steering unit and engage a bearing surface on the miner. There is no attachment between the displaceable guide elements and the miner, so there is no connection to be deformed or broken by shear stress. *See Baird Declaration, Paragraph 7.* Therefore, comparatively greater force may be exerted by the actuators in the present invention than the advancing cylinders in Mraz, as there are no pivotal connections at the termini of the actuators in the present invention to be damaged by shear stress. *Id.* This allows for the use of more massive miners and corresponding stronger actuators to steer the miners in the present invention than in the invention disclosed in Mraz. *Id.* Each of the other embodiments shown in Figs. 5b-d of the present invention share this characteristic as well. In all embodiments of the present invention, the actuators are mounted on and connected to one unit, be it the miner, steering unit, or conveying unit, and engage a bearing surface on another unit.

The MPEP instructs that, once an Applicant has presented rebuttal evidence, Office personnel should reconsider any initial obviousness determination in view of the entire record.

MPEP § 2141(V). In this case, evidence points towards an advantage of the present invention which is not disclosed by the cited prior art. Applicant therefore respectfully submits that the instant invention, as claimed above, is not obvious.

Petition for an Extension of Time and Request for Continued Examination

This paper includes a PTO Form SB/22, Petition for Extension of Time. The instant office action was mailed on February 1, 2011 and this response is being mailed with a certification of mailing on June 1, 2011, within four months from the office action mailing date. As such, the enclosed petition requests an extension of one month and authorizes the Director to charge the fee therefor to a listed deposit account.

This paper further includes a PTO Form SB/30 Request for Continued Examination Transmittal and authorizes the Director to charge the RCE fee to a listed deposit account.

Conclusion

Applicant's Attorney respectfully submits that, with entry of this amendment, claims 1, 3-20, 23-24, and 26-28 are allowable. As such, it is respectfully requested that the Examiner issue a notice of allowance. However, please call Applicant's undersigned Attorney at (502) 587-3722 should Examiner have any questions or unresolved issues with this application.

Respectfully submitted,



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